

PATENT COOPERATION TREATY

PCT

REC'D 12 OCT 2005

INTERNATIONAL PRELIMINARY REPORT ON PATENT APPLICABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference BP109276/OPS	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/FI2004/000274	International filing date (day/month/year) 06.05.2004	Priority date (day/month/year) 07.05.2003
International Patent Classification (IPC) or national classification and IPC C08B 37/00, A23L 1/10, A23L 1/308		
Applicant Suomen Viljava Oy et al		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 3 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
 - ☒ (sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:
 - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

- This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

Date of submission of the demand 07.03.2005	Date of completion of this report 03.10.2005
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI2004/000274

Box No. I Basis of the report

1. With regard to the language, this report is based on:

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):

- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1 - 12 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- pages _____ as originally filed/furnished
- pages* _____ as amended (together with any statement) under Article 19
- pages* 14 - 15 received by this Authority on 07.03.2005
- pages* _____ received by this Authority on _____
- ☒ the drawings:
- pages 1 - 2 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (specify): _____
- ☐ any table(s) related to the sequence listing (specify): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (specify): _____
- ☐ any table(s) related to the sequence listing (specify): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI2004/000274

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-15</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-15</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-15</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Cited document:

D1:US6060519, (see column 2, line 38-60, column 3, line 22-41 and column 4, line 28-46)

D1 is related to a method for the separation of a hydrocolloidal composition from barley or oats. The method involves heat-shearing of the oat or barley substrate in aqueous slurry. The treatment results in disruption of the cellular structures of the cereals which leads to enhanced solubility of β -glucan.

Claim 1 and 13 comprise a method and a composition where the solubility of non-starch polysaccharides in vegetable material is improved. This is done by using mechanical energy, 0.15-0.39 kW/kg, to crush the vegetable material.

The claimed method differs from D1 in that the mechanical treatment is performed to produce particles of a size $<100 \mu\text{m}$. According to D1 the treatment results in a hydrocolloidal solution, where the non-starch polysaccharides, (β -glucan) is completely solubilized. (See col. 5, lines 8-9). The claimed method according to claim 1 also differs from D1 in that the energy amount used when crushing the material is 0.15 - 0.39 kWh/kg.

The technical effect of the invention in view of D1 is to produce a crushed, vegetable material where the soluble polysaccharides are not completely solubilized. According to the invention this is done by choosing process conditions according to claim 1. The hydrocolloidal composition, according to D1, does not lead a skilled person to the claimed method and particulate product. Accordingly the claimed invention is not considered to be obvious. The claimed invention involves an inventive step and is also considered to be industrially applicable.

Claims

1. A method for treating a vegetable material with a view to improving the solubility of the non-starch polysaccharides contained in it, **characterised** in that the material is crushed by using mechanical energy in an amount of 0.15-0.39 kWh/kg to a particle size less than 100 μm , at least a major portion of the cells containing non-starch polysaccharides in the material being damaged during crushing, to produce particles containing non-starch polysaccharides with an improved solubility as the product is contacted with dissolving mediums.
2. A method as defined in claim 1, **characterised** in that at least a major portion of the non-starch polysaccharides contained in the cells end up in particles as produced by the crushing with a particle size smaller than that of the respective initial cell of the non-starch polysaccharide.
3. A method as defined in claim 1 or 2, **characterised** in that the material to be crushed is formed partly or completely of grains of corn, such as oat, rye or barley, or fractions of these.
4. A method as defined in claim 3, **characterised** in that the material is crushed to a particle size less than 50 μm and most advantageously less than 20 μm .
5. A method as defined in claim 4, **characterised** in that the material contains aleuron and/or subaleurone layers of grains, which are crushed to a particle size less than 50 μm , preferably less than 20 μm .
6. A method as defined in any of the preceding claims, **characterised** in that the method yields improved solubility of β -glucan or pentosan.
7. A method as defined in any of the preceding claims, **characterised** in that the material to be crushed contains amylopectin or a material rich in amylopectin, such as waxy rice or waxy barley.
8. A method as defined in claim 7, **characterised** in that the material to be crushed contains amylopectin or a material rich in amylopectin mixed with another biological material containing non-starch polysaccharides, such as oat grains or their fractions.

07-03-2005

15

9. A method as defined in any of the preceding claims, **characterised** in that the mechanical energy is generated by the joint effect of heat, pressure and shearing forces.

10. A method as defined in any of the preceding claims, **characterised** in that crushing is performed by extrusion.

11. A method as defined in claim 10, **characterised** in that the material to be crushed is pre-treated to moisture in the range from 6 to 20% .

12. A method as defined in any of claims 1 – 9, **characterised** in that the material to be crushed is mixed with a greater amount of liquid medium and the mixture is homogenised under a pressure of 50 to 800 bar.

13. A particulate product obtained by a method defined in any of the preceding claims, **characterised** in that the product contains a vegetable material, which has been crushed to form particles of a size less than 100 μm , in which at least a major portion of the cells containing non-starch polysaccharides in the material has been damaged, the non-starch polysaccharides contained in the crushed particles having enhanced solubility in an aqueous phase with which the product has been brought into contact.

14. Use of a material treated by a method defined in any of claims 1 – 12 in a food or a fodder, in which the non-starch polysaccharides have improved solubility in the digestive tract.

15. Use of the material treated as in claim 7 for controlled viscosity increase.